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SEPTEMBER 4.

Mr. THOS. MEEHAN, Vice-President, in the chair.

Sixteen persons present.

The death of John C. Dawson, a member, was announced.

Exudation from Flowers in Relation to Honey-dew.—Mr. THOS. MEEHAN remarked that our standard literature yet continued to teach that the sweet varnish-like covering often found over every leaf on large trees, as well as on comparatively small bushes, was the work of insects, notably Aphides. So far as he knew, Dr. Hoffman, of Giessen, who in 1876 published a paper on the subject, is the only scientific man of note who takes ground against this view. He met with a camelia without blossoms, and wholly free from insects, and yet the leaves were coated with "honey-dew," as it is generally known. He found this substance to consist of a sticky colorless liquid, having a sweetish taste, and principally gum. Mr. Meehan said he had often met with cases where no insects could be found, as well as others where insects were numerous, and where in the latter case, the attending circumstances were strongly in favor of the conclusion that the liquid covering was the work of insects.

He said he believed that few scientific men had any knowledge of the enormous amount of liquid exuded by flowers at the time of opening, and he had seen cases where the leaves were as completely covered by the liquid from the flowers, as if it had exuded from the leaves, as he believed Dr. Hoffman had good grounds for believing is often the case. He had already brought to the attention of the Academy cases where large quantities of liquid had dropped from the flowers to the leaves below, of which *Yucca*, *Mahonia* and some others had been recorded in the Proceedings of the Academy. *Akebia* had been noted by Mr. Wm. M. Canby to drop from the leaves at certain times, and Sach notes in his Text-book the moisture which fills the small flowers of *Thuja*. In connection with the last case, the exudation from Coniferæ, he met with a remarkable case during his recent journey through the northwest coast. While collecting plants along the east shore of the Columbia River he noticed a plant of *Alnus Oregana*, covered with honey-dew. The woolly Aphis, so well known for its preference for alder, also abounded. Little drops of liquid were in many cases attached to the apex of the abdomen, and the conclusion was reached that in this case at least, the probabilities favored the insect origin of the liquid on the leaves. Proceeding a few feet further, towards the trunk of a large spreading Sitka spruce (*Abies Sitkensis*), and then on the other side, a bush of *Pyrus rivularis* was observed also covered, but not a sign of an insect anywhere about it. This caused a reëxamination of the whole case, when it was noticed that stones under the spruce tree, forming the shore of the river, and many feet outside of the circle formed by the branches of the Pyrus and Alder, were quite black with a gummy coat, which most probably had fallen from the spruce, the branches of which overshadowed the two bushes already named, as well as the stones. The branches of the spruce hanging towards the river were covered with young cones of probably one-half their full size, and the scales were found to be filled with sweet liquid. Taking the cone as it hung on the tree and stripping it down as one would milk a cow, a drop as large as a pea gathered in the hand from a single cone. There could be no doubt but that the viscid covering on the leaves of the two shrubs below, as well as on the unprotected stones, came from the cones of the spruce tree. He had seen, two years ago, the glossy covering over the leaves of the *Liriodendron* at flowering time, and found the opening flowers with a large quantity of liquid at the base, and had intended especially to give the matter minute attention the past summer and then report to the Academy; but his long journey had diverted him. Recently the subject had been again brought to his attention during some experiments in relation to pollinization and cross-fertilization in *Platycodon grandiflora* not yet concluded. Cutting open very carefully a corolla just about to expand, the whole inner surface was found to be coated with minute drops of moisture, which, as they gathered in size, streamed down toward the base of the pistil. This liquid was not sweet, but had the taste of lettuce. In the case of the moisture which exuded from the divisions of the perianth in *Yucca gloriosa* and *Yucca angustifolia* before reported, the taste was rather bitter than sweet. He said there was reason for the belief that much of the moisture found at the base of flowers was not the product of "nectariferous glands," which were sometimes guessed at rather than always detected, but was rather the collection from exudation from the petals; and if so it was a confirmation of Dr. Hoffman's idea of the origin of honey-dew through the surface of the leaf, as we might reasonably suppose a modified leaf like the petal of a flower to have some functions in common with the primary leaves from which they sprung.

What is the object of this abundant exudation of sweet liquid and liquid of other character from leaves and flowers? The speaker said we were so accustomed to read of nectar and nectaries in connection with the cross-fertilization of flowers, that there might seem to be no room for any other suggestion. But plants like the *Thuja* and *Abies* were anemophilous, and having their pollen carried freely by the wind, had no need of these extraordinary exudations from any point of view connected with the visits of insects to flowers. In the case of *Thuja*, Sach had suggested another use: " The pollen-grains which happen to fall on the micropyle of the ovules are retained by an exuding drop of fluid, which about this time fills the canal of the micropyle, but afterwards dries up, and thus draws the captured pollen-grains to the nucleus, where they immediately emit their pollen-tubes into the spongy tissue. In *Cupressineæ*, *Taxineæ* and *Podocarpeæ* this contrivance is sufficient, since the mycropyles project outwardly; in the *Abietineæ*, where they are more concealed among the scales and bracts, these themselves form, at the time of pollination, canals and channels for this purpose, through which the pollen-grains arrive at the micropyles filled with fluid " (STRASBERGER).[1] Mr. Meehan said that in his former observations on liquid exudations in *Thuja* and other plants he was inclined to adopt the suggestion of Sach as to the purpose of the liquid supply; but as it was here in *Abies* so long after fertilization must have taken place, and as it was held up in the deep recesses of the scales of the pendent cone, where it could hardly be possible the wind could draw up the pollen; and as, moreover, the extract shows that these eminent botanists believe *Abietineæ* does not need the moisture they did not know existed in this abundance, we must look for other reasons, which, however, do not yet seem to be apparent.

SEPTEMBER 11.

Mr. MEEHAN, Vice-President, in the chair.

Sixteen persons present.

The death of the Curator-in-charge, Charles F. Parker, on the 7th inst., was announced.

Irritability in the Flowers of Centaureas and Thistles.—Mr. THOMAS MEEHAN called attention to some flowers of various compositæ on the table, sent by Miss Mary E. Powel, of Newport, Rhode Island, who has observed a singular motion in the florets of *Centaurea Americana.* This motion had long been known to German botanists, and a reference to some features of it may be found in Sach's Text-book of Botany, and there was an illustrated paper by Cohn in *Zeitschrift für wis. Zoologie*, vol. xii, showing the mechanism of the contraction of the anthers. As, however, the motion had failed to attract the attention of American observers, or at least he knew of no reference to it in any American work at his command, he believed it might do good service to place on record an independent statement of the phenomena as exhibited by the specimens before us.

Besides the motion in *Centaurea Americana*, observed by Miss Powel, Mr. Meehan said that he found a similar motion in the following plants growing in his garden: *Centaurea alba*, *Centaurea*

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[1] Sach, Text-book of Botany, Oxford edition, p. 449. The various ways of spelling micropyle in the same paragraph, are of course retained in the quotation.